

Resource Sustainability

Te Pūmau me to Tiāki Rawa

Teacher guide



Educating today for a sustainable tomorrow
Te whakaako ināianei kia tuitū ai a haere ake

ZERO WASTE
Mātauranga Parakore **Education**

www.zerowasteeducation.co.nz

Introduction:

Zero Waste Education (ZWE) is a waste minimisation education programme which teaches children about sustainable resource use through reducing, reusing, recycling and composting. Established in 1993 ZWE is taught in over 500 schools throughout New Zealand.

This Council funded programme enables children to investigate the link between Earth's natural resources, the products they use and see around them and the resulting waste that pollutes our environment. It empowers them to make decisions to reduce the waste pile by reducing, reusing, recycling and composting and by sharing their knowledge with others.

The programme consists of nine units each focusing on a specific solution to our waste problem. The units alternate each year so students receive new material while building on what they have previously learned. By the time students leave Year 8 they will have received eight units.

- Years 1 and 2: Is That Rubbish? and The Litterless Lunchbox
- Years 3 and 4: Reduce Unit and Reusing Unit
- Years 5 and 6: Recycling Unit and Composting Unit
- Years 7 and 8: Resource Sustainability Unit and Water Unit
- Years 5 to 8: Rural recycling

Teacher Guide Overview

This guide is provided to assist teachers in undertaking curriculum planning for learning in class. Included in all ZWE teacher guides are suggested hands-on extension activities. The guide promotes the inquiry learning process using the ZWE *Four R's of Inquiry*. A more detailed version of the inquiry model follows.



The ZWE visit takes place during the 'Research' stage of the inquiry process. During this time students will be immersed in the topic of 'Resource Sustainability' and will cover selected achievement objectives from the New Zealand Curriculum. The aim is for students to build up a knowledge bank and become experts in the topic.

Post ZWE, students are given an opportunity to 'Regroup' as a class and consider the current waste related issues in their school, home or wider community. Students are then able to 'Respond' to a specific issue they are passionate about as group or independently. To 'Reflect' is an important part of the inquiry process and students should be given a chance to review and share what they have learnt and the actions they have taken.

Timetabling

This unit consist of four 45-minute lessons. Teachers can opt for one 45-minute session over four days, or two 90-minute sessions (with a 10-minute break mid-session). All lessons are taught by specialist educator.

Teacher Obligations

We ask that teachers remain in their classroom for the duration of all lessons.

Workbooks

Each student receives their own workbook during the ZWE lessons. At the end of the unit students are encouraged to take their books home to share their learning with their whānau. A marking template is provided for the classroom teacher and gives answers to the formative assessment tasks in the student workbooks.

Resource Sustainability Unit

Natural resources – renewable and non-renewable are the focus of this unit. Students investigate current production systems and how they affect our ability to conserve natural resources. Alternatives to linear production systems and recycling are explored as solutions to this problem, as is replacing waste streams with clean streams.

After the ZWE visit teachers are encouraged to continue the learning through an inquiry learning process.



Make cities and human settlements inclusive, safe, resilient and sustainable

11.6. By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management. Students to investigate the amount of waste produced in different countries.



Ensure sustainable consumption and production patterns

12.2. By 2030, achieve the sustainable management and efficient use of natural resources. In the Resource Sustainability unit, students investigate natural resources and products made out of natural resources.

12.5. By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse. Zero Waste Education programme aims to educate students in waste minimisation by reduce, reuse and recycle.



Take urgent action to combat climate change and its impacts

13.3. Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. In the Resource Sustainability unit, students investigate environmental impacts from waste.

Additional activity

There is an optional homework activity in the form of a survey to be completed at home. The task is designed to be a way for students to share their learning and explore resource sustainability at home. The information from the survey can be used to complete one of the workbook activities as an extension activity.

Literacy Integration

A list of relevant journal and 'connected' articles is provided at the end of this document. Some suggested ways for integrating this unit into your literacy programme follow.

Persuasive writing: Single use plastic bags are banned in New Zealand. A take back system (with cents reward) for plastic, glass, steel and aluminum bottles and containers should be implemented in New Zealand again (Container Deposit Scheme). All plastic packaging should be made for #1, #2, or #5 plastics only. Students write a letter to the appropriate person in government arguing their point on one of these topics.

Explanation writing: Explain how recycling extends the life cycle of products and saves natural resources, for example such as aluminum cans. Explain the difference between a landfill and a dump. Explain the 'system of stuff', for each stage explain how resources are used and damaged.

Curriculum Planner

Zero Waste – Resource Sustainability			
Values: Community & participation. Ecological sustainability.	Key Competencies: Using language, symbols, texts. Participating & contributing.	Principles: Future Focus – sustainability.	Learning Areas: Social Sciences Health and PE Technology Science
Possible Achievement Objectives: Social Science (Level 3) Students will gain knowledge, skills and experience to: - Understand how people make decisions about access to and use of resources. Social Science (Level 4) Students will gain knowledge, skills and experience to: - Understand how producers and consumers exercise their rights / meet their responsibilities. - Understand how people participate individually and collectively to community challenges.			
Science (Level 3 & 4) Planet Earth and Beyond: Earth Systems Students will: - Appreciate / develop an understanding that water, air, rocks, soil and life forms make up our planet and recognise that these are also Earth's resources. Nature of Science: Participating and Contributing Students will: - Use their growing science knowledge when considering issues of concern to them. - Explore various aspects of an issue and make decisions about possible actions.			
Technology (Level 4) Technological Knowledge: Technological products Understand that materials can be formed, manipulated and/or transformed to enhance the fitness for purpose of a technological products.			
Health and Physical Education (Level 3) Healthy Communities and Environments: People and the environment Plan and implement a programme to enhance an identified social or physical aspect of their classroom or school environment. (NB: This AO is suited to the 'response' stage of the inquiry process.			

Suggested Inquiry Process

Inquiry stage: Research	
Pre-visit: Check in: what do we already know about Zero Waste? <i>Think, Pair, Share (class brainstorm)</i> . Explore concepts: <i>natural resources, products, waste</i> . What are these and where can we find them?	
During visit: Most of the <i>research</i> stage takes place during the ZWE visit with the educator. The learning intentions and assessment tasks in this stage are based around the ZWE lessons, activities, workbook and marking template. Each assessment task below relates to a workbook activity (see ZWE marking template for more information).	
Learning Intentions: Students will demonstrate how humans use natural resources for their own benefit. Students will understand how human activities can place stress on Earth's resources. Students can demonstrate how recycling can preserve the planet's natural resources.	Workbook Assessment Activities: A1, Page 3 List 5 things from the classroom that are all made from different natural resources: Students identify items in the classroom and the natural resources used to make them. A2, Page 4: The System of stuff: Students will provide reasons for resource degradation and depletion. A3, Page 9: Students how the recycling life cycle of a specific product e.g. aluminum can.
Inquiry stage: Regroup	
Learning Intention: Examine the current situation concerning waste in the school or wider community. Identify issues that influence our community's sustainability.	Focusing Ideas, Questions: - What are the issues? - How might they affect us now or in the future? - Why are they happening? - How do we feel about these issues? - Has our new knowledge changed the way we feel?
Extension Activities: - Create a class knowledge bank based on previous and new knowledge. - Think, pair, share / brainstorm using visual mind-mapping	

Inquiry stage: Respond

Learning Intention:

Respond to an issue concerning waste in the school or wider community.

Record findings / Improvements

Focusing Ideas, Questions:

- Which issue do we want to respond to?
- Can something be done?
- What could/would happen if...?
- How might we make others aware?
- How can our knowledge and ideas help others?
- How can we influence decisions made by others?
- Who is going to do what? *Who decides?*

Record findings / improvements:

- What sort of information should we show?
- How will we collect it?
- How will we sort and present the information?
- Who is going to do what? *Who decides*

Extension Activities:

- Greenhouse Effect Experiment: when rubbish rots in landfill it creates methane gas (a greenhouse gas which heats up the atmosphere). 1) Leave a thermometer on the ground on a sunny day (time for 5 minutes, read and record temperature). 2) Place the thermometer in an air-filled plastic bag for 5 minutes (read and record the temperature while in the bag). *Is it hotter inside the bag? Why do you think that is? (plastic traps the heat, this is similar to how greenhouse gases trap heat in the earth's atmosphere, making it warmer).*

- Audit the class and staff room bins, you could even audit the skip bin? You will need a tarpaulin, some reusable thick gloves (dishwashing gloves are good), choose categories and separate waste from bins into categories. For example, organic, paper, cardboard, recyclable containers (aluminum cans, steel cans, glass bottles and jars and plastics that are recyclable in your area). Once completed record findings and determine improvements that could be made.

Inquiry stage: Reflect

Learning Intention:

Share the learning journey with others, using a variety of ways to convey information.

Focusing Ideas, Questions:

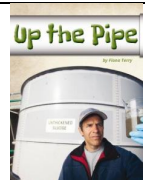
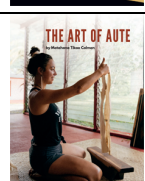
- How has the issue changed?
- What is different? *Is anything different?*
- What evidence do we have to show this?
- Have your feelings changed about the issue?
- What could we do better next time?
- What is left to do?

Extention Activities:

- Revisit the class knowledge bank, add to it with new knowledge.

- Explore ways of presenting information and share findings with as many people as possible.

Additional Resources

Title	Author	Series	Curriculum level	Reading year level	Publication date	Link
	Fiona Terry	School Journal	3	6	November 2014	https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-3-November-2014/Up-the-Pipe
	Rachael McMillan	School Journal	3	6	April 2012	https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-3-April-2012/Water-Worries
	Sarah Connor	School Journal	4	7	May 2021	https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-4-May-2021/Reducing-our-Footprint
	Matahana Tikao Calman	School Journal	3	5	August 2020	https://instructionalseries.tki.org.nz/Instructional-Series/School-Journal/School-Journal-Level-3-August-2020/The-Art-of-Aute

Website links are available from the **Zero Waste Education website**

<https://zerowasteeducation.co.nz/educationunits/resources-and-further-information/>